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ART. II.—*Observations on Atmospheric Influence, chiefly in reference to the Climate and Diseases of Eastern Regions, in Five Parts, by W. AINSLIE, M.D., M.R.A.S., F.R.S.E.*

Read 5th July, 1834.

PART THE FIRST.

REMARKS ON CLIMATE IN GENERAL.

“Aer quoque ipse, qui purus sacram vite flammam alit, impurus factus, eandem statim extinguere potest, vel multis vaporibus onustus, aut novicis quibusdam effluviis corruptus, ingentem morborum cohortem inducere.”—*Medicinæ GREGORII Conspectus.*

“To understand man, therefore, we must know wherefore it is that air is needful for his support: so to understand air, we must trace its relations to human life.”—PASCAL.

“Cælum, anni tempestas, solum, mare, montes, lacus, paludes, flumina, vapores, exhalationes, meteora, aerem ita permutant ut erect varios morbos, non pendentes adeo ex ipsa aeris indole, ejusve dotibus, qualitativisque, quam quidem ex natura et efficacia admisti: unde etiam indi inquire atque intelligi debent.”—*Institutiones Medicæ BOERHAVI*, p. 319.

FROM the most remote antiquity, the condition of the air, its temperature, the variation of the seasons, and the nature and quality of the winds, have been allowed to have a powerful influence on the frame of man, and to be no questionable sources of the healthiness or unhealthiness of the human race: nor is it strange that they should have been. We know that the father of medicine, HIPPOCRATES, who flourished towards the beginning of the fourth century before Christ, attributed much to such causes, as we may learn by consulting his *History of Epidemics*,¹ so well edited by Dr. FARU; also his work, “*De Aere, Aquis, et Locis*,”² in which he attempts to account for the difference of character betwixt the inhabitants of Europe and Asia; and, in the course of his investigation, recommends particular attention to be paid to the direction of the winds, and even to the rising

¹ See Work, chap. 1.

² See HIPPOCRATES, “*De aere et locis*,” xl.

and going down of certain stars: CELSUS,¹ who is supposed to have lived in the reign of AUGUSTUS, ascribed a great deal to the air and weather as conducing to health or otherwise: and GALEN,² who was for learning and talent justly considered as the ornament of his age, calls the notice of his readers, in many parts of his writings on medicine, to the condition of the atmosphere. POSIDONIUS, a philosopher of *Apamea*, believed dry air to be especially beneficial to the understanding; nay, DIODORUS SICULUS,³ who wrote about forty years before the commencement of the present era, goes so far as to say, that that element, in its purity, was favourable to arts and sciences. What advantage PLINY⁴ thought might be derived from the same source we may readily ascertain by referring to his *Natural History*; as for VIRGIL, we absolutely find him making it one of the delights of Elysium.

“Largior hic campus, æther et lumine vestit purpureo.”—ÆNEID.

CICERO⁵ was of opinion that the lively and acute genius of the Athenians was in a great measure owing to the air of the capital — “*Athenis tenue cælum, ex quo etiam acutiores putantur Attici: crassum Thebis, itaque pingues Thebani!*” And in speaking of Ancient Greece, ROBERTSON⁶ thus expresses himself—“The climate of those happy regions, equally exempted from the rigorous cold, which afflicts the inhabitants nearer to the poles, and from the sultry heat by which those within the torrid zone are oppressed, abounded with every influence propitious to the human race; the air was sweet, healthful, and uniformly temperate — invigorating without chillness, and soft without effeminacy.” On the other hand, let us see what some of the ancients have said of the same fluid in a less pure or vitiated state. ATHENEUS⁷ in his *Deipnosophistæ*, has told us, that a thick heavy air makes the manners rude and uncivilised; so, as we find mentioned by FALCONER, in his valuable work on climate; ARISTOTLE⁸ observed that marshy situations render people dull, stupid, and uninteresting.

¹ Vide Oper. CORN. CELS. lib. i.

² Vide Oper. GALEN, lib. xi.

³ Vide DIOD. SIC. Descrip. Indiæ.

⁴ See Nat. History, lib. iii. cap. xxxviii.

⁵ See his Work *de Fato*.

⁶ See ROBERTSON'S History of Ancient Greece—*Introduction*.

⁷ His work is replete with much curious matter and many interesting anecdotes of the ancients—he was a grammarian of Naucratis. Vide Athen. lib. xiv.

⁸ Vide Prob. xiii. quest. ii.

The natives of India are by no means inattentive to *atmospheric phenomena*, though, from their more fixed seasons, these cannot be supposed to prove the same anxious object to them that they are to the inhabitants of the temperate zone, where there are frequent and often rapid changes of weather: a celebrated *Sastrum*, touching on the subject, may be found in the *Siva Pagoda*, at *Tenkouchi*,¹ in Lower India, and entitled *Ganetamnotum*. The Persians of old were great observers of the seasons; and even in later periods they do not appear to have totally neglected such inquiries, as we learn by several works, for instance, *جامع العلوم Jáma' Al-Ulúm*, composed by SÚFÍ MUHAMMAD GHOS, of Gwalior, on astrology, geography, omens, &c. &c., and a celebrated book called *ميزان طب Mízán-Tibb*, on heat, cold, moisture, and draught; and which was found in the library of the late TIPÚ SULTÁN.

To descend to still more modern times, we may advert to what BONTIUS² has written concerning the effects of *bad air* experienced by him at *Batavia*; or what Dr. BLAKE³ has given us, with a more masterly hand, in comparing that with the same element in its pure and strengthening condition. However, without entering here at length on the subject of the consequences of different temperatures on the human frame, which will be more in place in another part of these observations, it may be sufficient to mention generally, that cool air constricts the external fibres, thereby increasing their elasticity and favouring the return of blood to the heart; hence it is said, that the natives of cold climates (I speak not of extreme cold) are more vigorous than the inhabitants of the torrid climes; and this superiority of strength, says MONTESQUIEU,⁴ must be conducive to various results; for example, a greater self-confidence, consequently more courage; a greater sense of superiority, consequently less desire of revenge; a greater conviction of security, and, on that account, more frankness, less suspicion, and less cunning. Hot air, on the contrary, it has been allowed, enervates and relaxes the body, excites the action of the nervous system in general, and of the cutaneous nerves especially, and renders them more susceptible of any impression; at the same time, by the great cuticular discharge which it induces, a corresponding exhaustion and faintness are occasioned, and with these, naturally less hardihood and animal intrepidity. To

¹ In the Tinnevelly district.

² See BONTIUS's Account of the East Indies, pp. 107—118.

³ See BLAKE on the Diseases of Seamen, pp. 177—204.

⁴ See MONTESQUIEU's Spirit of Laws, vol. i. book xiv. chap. 2.

this varying temperature, to a certain degree, may no doubt be traced those different shades of character by which nations are distinguished, though other peculiarities are, we believe, not less influential. It will not be disputed, with respect to the physical effects of inordinate heat for a great part of the year, that it must tend in some measure to diminish the race in those countries where it is experienced; so Mr. ELPHINSTONE, in his valuable account of *Kábul*¹ has observed, that while in *Hindústán* proper the natives are tall, well made, and of slow and deliberate speech, the inhabitants of the *Karnatik*, where the heat is much greater, are small, black, and remarkable for vehemence of action and volubility. The author above mentioned (MONTESQUIEU), in pursuance of his theory that the inhabitants of warm climates are, like old men, timorous,² and that the heat of a climate may be so excessive as to deprive the body of all vigour and strength, and also communicate its mal-influence to the mind, proceeds to say, that the natives of India are naturally a cowardly³ race, and that even the children of Europeans born in the Indies lose the courage peculiar to their own climate. Now, with all due deference to the acknowledged talents of this distinguished author, I must say that he does not appear to have been aware that there is such a thing as a *moral* courage as well as a physical and animal, and on which no temperature of air has the smallest effect; I cannot allow the word *cowardly* to be in any degree applicable to the natives of *Hindústán*—nowhere on earth do men meet death with more resolution than in our Indian dominions—what name they deserve as soldiers, when well commanded, I leave to their European officers to say; and, above all, to the great captain of the day, who will do them the justice he does every man!

XENOPHON tells us (*Cyropædia, ad finem*), that the Asiatics in his days would not fight unless under Greek auxiliaries; and LIVY somewhere, if I recollect well, in speaking of the Macedonians, observes, that those in Egypt had degenerated so much from what they were in the time of ALEXANDER, that they would fall an easy prey to the Romans! But what does Lord KAISER say on the same subject in his sketches on man? Why, that the heat of a climate has no power whatever in diminishing the courage of a people,—witness the Malays.⁴

¹ Account of *Kábul*, p. 248.

² MONTESQUIEU's *Spirit of Laws*, vol. i. book xiv. chap. 2.

³ See the same, vol. i. book xiv. chap. 3.

⁴ See FALCONER on Climate, p. 20.

A great deal has been written, and more said, on the supposed consequence of a hot climate on body as well as mind, and supineness, indolence, and languor, have been by some believed to be equally the effects with corporeal weakness; perhaps no man has treated this subject with more judgment and discrimination than CHATFIELD, in his admirable *Review of Hindústán*. "Tranquillity," says he, "has been represented as the chief object of desire in the torrid zone, and the evils of despotism to be less severe than the labour of being free; slavery, by the strength of custom, blends itself with human nature: the simplicity of absolute rule, its prompt justice, and imposing appearances, naturally recommend themselves to an ignorant and listless race; and, lo! public virtue disappears! It is not to be disputed that throughout the world despotic sway prevails most in warm climates; and to the influence of such climates, and to the effect of local prejudices, a considerable force may undoubtedly be ascribed; but to assert that an arbitrary government is absolutely necessary for the happiness of the nations of the East, seems a paradox beyond the power of solution by any effort of human ingenuity." The author continues to observe, "the fallacy of such opinions may easily be proved by the history of both the eastern and western world. The natives of *Phœnicia* and *Palmyra* rendered themselves conspicuous by their commerce and their attention to the liberal arts; the *Greeks* and *Arabians* shone equally in arts and arms. Where are now the heroes of *Sparta* and *Athens*? of the fields of *Marathon* and *Platœa*? If the men of those nations were inert, what is activity? The *Lazzaroni* of *Naples*, the fanatics of *Rome* and *Sicily*, are descended either from the Roman, the Goth, the Lombard, or the Norman: will it be alleged that the climate is changed and therefore more favourable to despotism; if so, where are the proofs? If the *climate*, then, be not allowed to have such an effect upon those political changes, it must be looked for in other causes; the nature of the soil has, indeed, a real influence upon activity, as men are either rich or poor, as their wants are few or many; the energies of their minds are called forth, and the improvement of their natural faculties promoted. But the true sources and regulations of the activity or indolence of individuals, as well as nations, are the social institutions of government and religion; and, as a proof of their agency, we have but to compare the state of the Romans under *Scipio* and *Tiberius*; or that of the Poles under *Sobieski* and *Stanislaus*; or that of the Greeks under *Aristides* and the *Porte*."¹

¹ CHATFIELD'S *Historical Review of Hindústán*, pp. 224, 225, 226.

Dr. THOMSON, in his excellent and comprehensive *Elements of Materia Medica*, has advanced this notion, that the heat of a torrid region renders those who inhabit it irritable; yet, I would ask, where is there more patience or coolness of temperament evinced than in India? and in justification of this, let me here adduce what has been said by one of the ablest writers of this or any other country. "The sun, it would appear, which ripens the pine-apple and the tamarind, inspires, at the same time, a degree of *mildness* that can even assuage the rigours of despotic government; and such is the effect of a *gentle* and *pacific* disposition in the East, that no conquest, no irruption of barbarians terminates, as they did amongst the stubborn nations of Europe, by a total destruction of what the love of ease and pleasure had produced."¹

Man, in his animal capacity, is unquestionably qualified to subsist in every climate; and, as has been eloquently said, "according to circumstances, can reign with the lion and tiger under the equatorial heats of the sun, or associate with the bear or rein-deer in the Polar regions!"² his versatile disposition fits him to assume the habits of either condition, or his talent for arts enables him to supply its defects. But the intermediate climes evidently appear most to favour his nature; and so it is, that it is in the temperate zone he has ever attained to the principal honours of his species; though it must, at the same time, be granted, that whatever may have been done to improve, or bring to perfection, the exertions of the human race in colder countries, it is in *India*, and in the regions of that hemisphere, which are visited by the vertical sun, that the arts³ of manufacture,⁴ and the practice of commerce, are of the greatest antiquity, and have also survived, with the smallest diminution, the ruins of time and the revolutions of empires!⁵

I have said that Dr. THOMSON considered the heat of the torrid zone as conducive to irritability; and that, on the other hand, FERGUSON dwells with complacency on the characterising mildness, gentleness, and pacific disposition of the Hindús; here are certainly differences not to be easily reconciled. On the young and delicate,

¹ FERGUSON'S History of Civil Society, pp. 185, 186.

² The ancients believed the Polar regions to be uninhabitable from the extreme cold which there prevails; (DIOG. LAERT. vii. 156). So MACROBIUS says, "Quia torpore ille glacialis, nec animali nec frugum vitam ministrat."

³ See ROBERTSON'S Disquisition on Ancient India, p. 2.

⁴ See BRUCE'S Travels, vol. i. p. 368. Also MONTESQUIEU on the Commerce of the Ancients, book xxi.

⁵ See FERGUSON'S Civil Society, p. 105.

ROBERTSON¹ observes, a diminished temperature of the air has a remarkable effect in rendering them fretful, and frequently gloomy and desponding; and hence it is, that people living in high northern latitudes have commonly little quickness and vivacity of thought: and I think it is the venerable DE THOU, who mentions a peculiar effect that a low temperature of the air had on Henry III. of France,² who, though naturally of a pleasant temper and gay disposition, was uniformly remarked to become irascible, capricious, and even cruel, during the prevalence of cold weather. Such opposite sentiments, respecting matters we should suppose of every day occurrence, are, to say the least, strange; and, I should suppose, could only have arisen from a neglect in not using sufficiently definite terms. There can be no doubt that the effects of a warm climate (but still within the temperate zone), in latitudes, for instance, embracing Italy and Greece, must be to stimulate and excite without debilitating; hence we perceive the inhabitants of those regions, compared with their more northern neighbours, lively, hasty, acute, imaginative. But let us increase the heat and its duration by getting into the torrid zone, and we shall find ensue a characterising languor, exhaustion, and weakness, together with that *mildness* and *gentleness of manner*, which, as we have seen, FERGUSON believed to be consequent of the higher temperature of the air.

It has been remarked, that in hot countries both the mental and corporeal faculties of man reach their maturity sooner than in more temperate climes, whatever may and must be the bad effects of too long exposure to torrid heat: perhaps it may not be considered as out of place here to notice what happens to young men on first proceeding to the West Indies, according to Dr. MOSELEY.—“There,” he says, “they soon acquire an expansion of mind, ripening, as it were, in the sun, and becoming superior in intellect to what they would have been had they continued in Europe!”³ He further remarks, that *idiotism* is totally unknown in these islands, and that *mania* is of very rare occurrence. In reference to India I will not go quite so far as the author just mentioned; but this I will aver, that both imbecility of mind and insanity are more rarely met with in Hindústán than in Britain, whether proceeding from the copious

¹ See ROBERTSON'S Natural History of the Atmosphere, vol. ii. p. 247.

² He was elected King of Poland in 1573, and quitted this dignity three months after to succeed his brother Charles IX. on the French throne.

³ See MOSELEY'S Treatise on the Climate and Diseases of the West Indies, p. 114.

cuticular discharge, the almost constant and cheering sunshine, and great serenity of the air, or from whatever other cause, I shall not take it upon me to say. I have been informed, from unquestionable authority, that the Marquis of WELLESLEY, soon after his arrival at Calcutta, was particularly struck with the talent, discrimination, and comprehensive views often evinced in the records, memorials, and public papers, drawn up by young men employed in different military and civil departments, at a time of life from which far less matured opinions could have been expected in the mother country.

Allowing this effect from a tropical climate, and that it does animate and stimulate to early mental exertion, it becomes a question, whether it does not also ultimately occasion a more speedy decay? I am not altogether prepared to give a decided opinion on this point; one thing certain is, that those Europeans who do resolve on remaining for life in India, seldom attain to great age; and it might be reasonable to conceive, that the stimulus of heat, like any other exciting power, long continued, would enervate and debilitate the frame, whatever might be the consequence of exposure to it for a shorter period. A parallel drawn betwixt the East and West Indies, with respect to such matters, would not be, I presume, a fair one, as the climates are in many respects dissimilar. In the latter the temperature of the air is never known to reach that extreme degree which it often does in Hindústán, 110° , 115° , 125° in the shade. MOSELEY says, that "in Jamaica European animals degenerate, and that as they descend, in a few generations they retain but little resemblance of the original stock. How far (he continues) this extends to the human race, as relative to natural endowments, is a subject of nice inquiry: however, if inferiority be found at all, it does not appear in the first generation; on the contrary, if my observation be just, in people of this description there is equal capacity and stability of mind, with more *acumen*, than in those born in Europe. Whether this diminishes or not in further removes without European admixture, abstracted from the influence of habit and education, may admit of speculation; but let the change be how it may, or what it may, I have never observed any declension of the heart, nor in the tendency of the mind, that philosophy could possibly attribute to nature."¹

The children of European parents in India being almost invariably sent to the mother country at an early period of life, it is impossible to say what might be the effect of their remaining in the hot climate

¹ See MOSELEY, p. 113.

till a more advanced age: the great change which has been resolved on with regard to our Asiatic dominions, in permitting colonisation to a certain extent, will give, in all probability, an opportunity of drawing more certain conclusions on this important subject; it being in contemplation, I understand, to establish seminaries, for the public instruction of youth, in several of the elevated and healthy stations of India, which have of late years been sufficiently appreciated, as well amongst the *Himalaya* mountains, as in *Mysore* and in the *Nilagiri* district. I should, however, for reasons above stated, with regard to the ardent heat often experienced in our Asiatic territories, be disposed to think that the result would be somewhat different from that which is found to take place, by MOSELEY's account, in the West Indies. As far as the age of four or five, I have remarked that the offspring of European parents in Hindústán thrive admirably; beyond that period they generally shoot up too rapidly, and become thin and pale, without acquiring that liveliness and energy which distinguish those of the same age in Europe. What might be gained by having children brought up in any of the *sanitariums* above mentioned, is another matter: the plan appears to me to be at once rational, altogether practicable, and what we would recommend to those who cannot afford the expense of education in England.

It is commonly understood that intermixture improves the animal species: it certainly does so as regards the inferior orders, and so it has been believed to do, with respect to the human race, in the temperate zone; but, with immediate reference to India, and the half-caste there, I am in great doubt if it holds good, and why it should not it might be difficult to say. Far be it from me to imply that there are not amongst that description of people many individuals manly in form, clear in understanding, honourable in heart, and sufficiently courageous; what I could wish to express is, that, generally speaking, they are an inferior race, possessing neither the vigorous frame of the European, nor the delicate, grave, unobtrusive, and contemplative mind of the Hindú. Some may allege that this is an exaggerated character of the intellect of our Indian fellow-creatures, the Hindús, and would sooner maintain that these Asiatics are, as far as regards the thinking principle, infinitely inferior to the inhabitants of more temperate regions; but this, no man who has been in India, and at all observant while there, will allow; for the natives, more especially the well-educated Bráhmans, are extremely acute, reason sagaciously, and are perhaps the quickest and best calculators in the world; and I am much disposed to believe that few adages are more just than this, and which is common in the Karnatik, "He must have his wits about him who

attempts to negotiate with a Mahratta." What the Hindûs would become, if educated as they might and ought to be, and, it is hoped, now begin to be, by that country which professes to bestow on them a parental care, it is hard to say. Their assiduity is great; their zeal unremitting; their moral, or rather their religious courage, quite extraordinary. Where, but in India, shall we find men immolating themselves to prove the sincerity of their opinions, and their trust in their God? or women undauntedly stretching their delicate frames on the blazing pile of a beloved husband?¹ No where.

To recur to our more immediate object, I would observe, that though no one will deny that much must ever be ascribed to the mere influence of climate (and of this there is a great variety), consequent of many things unconnected with latitude (as shall afterwards be more fully noticed), yet it will at the same time be allowed, as before observed, that the physical as well as moral condition of our nature, are powerfully affected by various causes altogether independent of that great agent; such as food, state of civilisation, peculiar habits and pursuits, and, above all, government. "Why," says the eloquent VOLNEY, "in the same countries where so much courage was displayed in days of old, in *Media*, *Parthia*, *Persia*, in the land of the *Carduchi*, do we at present find such profound indolence? Will it be alleged that the climate has changed? Whence is it that we see under our own eyes, and in Europe itself, northern governments as languid as those of the south?"² Can we, I would ask, for a moment suppose, that the inhabitants of our island were the same energetic beings in mind and body, when first visited by the Romans (leading the precarious lives of hunters, and feeding chiefly on the thin scanty fruits of the earth), that they now are, enjoying all that true religion, advancement in the arts, sciences, and commerce, can bestow; and blessed with a government which makes men brave, because it makes them free? Certainly not. But there is a change, I shall say, a great melioration, that this peculiar country has undergone, and which depends on yet other causes than any of those enumerated—I mean a change arising from an *admixture* with the natives of the different regions, by whom Britain has on various occasions been subjugated. It is remarked, as already noticed, that intermixture improves the race; and so far Britain, generally speaking, may be said to have

¹ I find both STRABO and DIODORUS SICULUS mention the circumstance of the Indian women burning themselves with their husbands: the latter, who wrote about forty-four years before Christ, describes the awful ceremony nearly as it is now practised.—*Vide* DION. SIC. *Hist.* lib. xix.

² VOLNEY'S *Travels*, vol. ii. p. 465.

benefited. But let us take into consideration by what description of those foreign conquerors our provinces were overrun, and we shall conclude how greatly we gained by their aggressions. It was not by the puny and imbecile. No! it was by the hardy, the brave, and the enterprising; who had not only to cross a tempestuous ocean, but combat a fierce people immediately on landing: so that when we were subdued, it was by the *élite*—in other words, by the most energetic men of these territories from which the assailers came. And it is, in my humble opinion, owing to this very circumstance of commixture with the best parts of various nations, that we now possess those high qualities which distinguish our happy land; for taking it for granted that the ancient Britons were simply on a par with other, yet unconquered and neighbouring countries, what did they receive from the Romans? Why, they taught them to build, to plant, to sow, to reap, with care. What came with the Saxons? A love of freedom,¹ energy,² hospitality,³ good morals,⁴ shrewdness, and, if we may trust to what has been said by CÆSAR⁵ and TACITUS, gallantry and veneration⁶ for the fair sex.

If, as we have seen, unconnected with climate, that civilisation, an advanced state of the arts, and good government, can produce wholesome changes on the inhabitants of a country; so can kingdoms deteriorate from circumstances independent of the same agent. “The ancient Spaniards in the time of the Roman republic, and long after its downfall,” says ROBERTSON, “were celebrated for their bravery, and seem to have made considerable advancement in literary pursuits, nay, probably, also in the cultivation of every branch of science; even in the fifteenth century they continued to be, perhaps, the most sprightly and polite nation in Europe. At the present period, from causes altogether distinct from the temperature⁷ of their climate, they have become grave and inactive in a remarkable degree.”

¹ In matters of small importance amongst the ancient Germans, the chief alone would often deliberate; but all great affairs were referred to the whole community.—TACIT. *De Morib. German.* cap. 10.

² TACITUS speaks in praise of the energy of the ancient Germans.—*Idem*, 37.

³ No nation ever testified more liberality than the ancient Germans in their convivial entertainments.—*Idem*, lib. xxi.

⁴ HERODOTUS informs us, that good morals had more influence amongst the ancient Germans than laws in other countries.—HEROD. v. 19.

⁵ The ancient Germans held women in great estimation, and believed there was something almost sacred in their nature.—CÆSAR, *Bcl. Gal.* lib. i. cap. 50.

⁶ TACITUS mentions several German prophetesses who were held in the highest veneration.—*Hist.* iv. 61–65.

⁷ See ROBERTSON'S General View of the Natural History of the Atmosphere, vol. ii. pp. 253, 254.

Let us compare the Italians of these days, priest-ridden, unwarlike, and bending under a foreign yoke, with the Romans of old, "*dum Roma fuit*," and we shall see how much they differ; yet there is no reason to think that the climate of Italy has materially altered within the last eighteen hundred years, although, if we may judge by the writings of JUVENAL and VIRGIL, the first of whom was contemporary with TRAJAN (A.D. 120), the latter with AUGUSTUS, thirty years before Christ, it must be granted that the temperature of that country was in some degree colder in their days than it now is, in spite of the high state of cultivation in which it was maintained in the reign of the emperors; and do we not know, that the younger PLINY had a villa in *Tuscany* where neither olives, nor myrtles, nor any other plant which requires a warm climate, could be raised? Look at Greece, the birth-place of all that is ingenious, beautiful, and instructive; the very cradle of taste, refinement, and warlike enterprise—what do we now find in that once highly favoured land? The picture is so frightful that I will not draw it! Yet the same breezes now blow which fanned in days of yore the brow of Pericles; the same sun shines upon Olympus; the same dews fall, which refreshed and made lovely the vale of Tempè!

As far as regards simple climate, no one could for a moment doubt but that it may be improved to a certain extent in any part of the world, by means altogether within the reach of man's industry. For instance, by draining marshy lands, by cutting down or thinning woods, by extensive cultivation of the soil, and by the warmth which must be the certain consequence of populous towns, and numerous and thriving villages. STRABO informs us (Lib. v. cap. 12), that the *Pontine marshes* were in his days reckoned unhealthy; they are unhealthy still, in spite of what was done of old by AUGUSTUS, followed up by TRAJAN, resumed after a long lapse of time by the Popes BONIFACE VIII. and MARTIN V., who cut canals—a pious work, recommenced at a later period by SIXTUS QUINTUS in 1580. Some suppose that little mention is made of the unhealthiness of ancient Rome itself by the old writers; but this is a mistake, of which any one may be satisfied by looking into LIVY's History (Lib. VII.): and we know how HORACE expresses himself at the painful thoughts of returning to Rome from the country—

"Me constare mihi scis, et discedere tristem,
Quandocunque trahunt invisâ negotia Romam."

We have seen how climates may in some degree be improved by man's exertions; but so can they also be rendered worse by his neg-

lect, inactivity, or want of means. The great causes which alter the moral aspect of nations are very different, and are chiefly consequent on conquest, subjugation, commercial depression, or any other adverse pursuits; above all, the intrusion of ignorant and barbarous hordes, by which government, customs, manners, and religion, are all in time changed. But even when such great changes are in this way occasioned, it would appear that it is the form, or more properly speaking, the quality, rather than the degree of intellectual power that is thereby altered; for there is, as has been well remarked by FERGUSON, "a vigour, a reach, a sensibility of mind, which may characterise as well the savage as the citizen, the slave as well as the master; and the same vigour of mind may be turned to a variety of purposes. A modern Greek is, perhaps, mischievous, slavish, and cunning, from the same animated temperament that made his ancestors ardent, ingenious, and bold in the camp, or in the council of the nation. A modern Italian is distinguished by sensibility, taste, quickness, and art; while he employs on trifles the capacity of an ancient Roman, and exhibits now, in the search of a frivolous applause, that fire, and those passions, with which GRACCHUS burned in the forum, and shook the assemblies of a severer people."¹

It might be supposed, that somewhat similar climates might be always found in similar latitudes; but this does not appear to hold good. In equal latitudes, the cold of the southern hemisphere has been considered as much greater than that of the northern,² in consequence, it may be presumed, of the greater extent of ocean south of the equator. If the climates vary in similar latitudes in different parts of the world, so are the productions different, animal as well as vegetable; witness those of *Van Diemen's Land* and *Spain*, or *Italy*. With respect to *America*, also, do we not find, that under the same parallel of latitude, with situations in Europe, the climates are very different. In the first-mentioned, extensive marshes, great lakes, aged, decayed, and crowded forests, with other peculiarities which mark an uncultivated country, are supposed (and justly, too) to replenish the air with heavy noxious vapours, that give a double asperity to the winter, and, by the frequency and continuance of fogs, snow and frost, carry the inconveniences of the frigid zone far into the temperate.³

¹ FERGUSON'S Civil Society, pp. 182, 183.

² See WILSON on Climate, p. 248.

³ See Professor SNOW'S Oration on the Effects of Climate on National Character, delivered at Copenhagen in 1832.

Abbé RAYNAL,¹ under the influence, perhaps, of his occasionally over-excited imagination, assigns, as a reason for the difference of climate betwixt America and Europe in similar latitudes, the great waters at the flood having left the continent of the former country at a later period than that of Europe—a circumstance which must have had an effect on men as well as the brute creation; hence it is, that there are few of the latter of any kind, and that the human race in those vast regions have comparatively less strength, less courage, less beard, and, indeed, hair of any kind. In opposition to these somewhat poetic notions of the eloquent Frenchman, we find WILSON, in his *Observations on Climate*, above cited, stating² that the *aborigines* of America, from latitude 30° to 65°, are a bold, manly race, well made, and by no means deficient in mental qualities. As far as regards the simple temperature of the two continents of Europe and America, it will not be considered as irrelevant here, to notice what has been said on the subject by one who has paid great attention to *meteorology*: I mean Professor LESLIE. He is of opinion that there has been too much exaggeration with respect to the comparatively low temperature of the American continent, as consequent of such causes as I have above enumerated: he thinks it probable that the extremes of summer heat and winter cold, may probably differ in America, and in the old world;³ but that the mere temperature on any parallel appears, when taken correctly,⁴ to be nearly the same. It is well known, he adds, that the difference in degree of heat betwixt the winter and the summer months, increases in advancing from the equator to the poles.

As a further proof that similar climates are not to be always looked

¹ See his *Historical and Political History of the East and West Indies*, vol. vi. p. 264.

² See *Work*, p. 258.

³ In a well-written paper on the Medical Topography of New Orleans, to be found in the twelfth volume of the *Edinburgh Medical Journal* for 1816, the author observes: "It is one of the anomalies of the new world, not yet very satisfactorily accounted for, that the intensity of the heat in summer, and the cold in winter, is much greater than in the old world on the same parallels of latitude. No doubt the extent of land in comparison with ocean cannot fail to make a change in climate in any part of the earth; for instance (as PROUT observes in his *Treatise on Chemistry, Meteorology, &c.* pp. 186, 187), 'if the Pacific or Atlantic Oceans were to be converted into continents, would not the climates of the existing continents be completely altered by such an addition to the land, and the whole of their fertile regions be reduced to arid deserts?'" But, after all, such suggestions are more ingenious than conclusive.

⁴ See article *climate*, in the last edition of the *Encyclopædia Britannica*.

for under the same parallels of latitude, we may compare great part of *Tartary* with *Greece*, *Italy*, and *Spain*; so it is also, we perceive, that while the shores, not only of the Mediterranean but even those of the Atlantic, are favoured with a moderate change and vicissitude of seasons, the eastern parts of Europe, and the northern continents of Asia, are afflicted with all their extremes.

How far does the climate of the southern provinces of Hindústán correspond with that of those territories stretching betwixt the river Senegal and the Gold Coast, in Africa, in similar latitudes, and in which *Sierra Leone* is included? a question to which any well-informed man can readily reply: and certainly every gentleman of this society, who knows the pure and healthy, though hot air which distinguish the first-mentioned regions, and who must have read of the pestilential cline of the last, so destructive to thousands annually;¹—differences no doubt originating in the nature of the countries, and arising chiefly, in these instances, from dry, cultivated, and open plains, in contrast with vast and almost impervious woods, marshes, and large, lazy, and muddy rivers. What climate did GERARD meet with in Kábul?² He says, a delightful one, and much colder than its latitude would have indicated ($34^{\circ} 10' \text{ N. lat.}, 69^{\circ} 15' \text{ E. long.}$); the consequence, he believes, of the natural aridity of the atmosphere there, together with irrigation, and to the extensive range of high lands which lie at no great distance from it, towards the north-west. It would, I am inclined to think, be more difficult to account for the singular climate of *Bokhárá*; not so much for its high temperature in summer (that occasionally reaching to 106° in the streets), for it is in latitude 39° , but for its cold in winter, which is so considerable, that the river Oxus (*Jihon*), at no great distance from it, freezes to such a degree in winter,³ as to bear the transit of *Káfílas*! extremes which are without example, I should presume, in any country in Europe.

It has oftener than once occurred to me whether or not there might not be a similarity of climate consequent, in a certain degree, on a similarity of formation of great continents, and their peculiar position with respect to the ocean, particularly if they are in nearly corresponding latitudes, north or south. EARL MUNSTER, in his in-

¹ For an account of the climate of the coast of Guinea, and other parts of Africa, we refer to Dr. JAMES JOHNSON'S very valuable work on the Influence of Tropical Countries. In speaking of the climate of *Sierra Leone*, he says about a third part of the white population is carried off annually.—See Work, p. 338.

² See GERARD'S Letters published in the *Journal of the Asiatic Society of Calcutta*.

³ See same Letters.

teresting *Journal of a Route across India, and through Egypt to England, in 1817*,¹ notices the striking resemblance which exists betwixt the geographical structure of India and that of the South American continent.² "The vast chain of the Andes (he observes) on the west, being sixty miles from the Pacific ocean, to which it presents a *precipitous face*, and slopes by a gentle declivity towards the Atlantic, into which the *Amazon, Plata*, and other rivers, which have their sources near, run; in the same manner the great rivers of peninsular India, the *Godaveri, Kistnah, Káveri*, and other streams which fall into the Bay of Bengal, take their rise near the sea on the Malabar coast." Here is a singular topographical similitude, and first observed, I believe, by the distinguished individual just mentioned. It would, I confess, be desirable to ascertain what were the especial results of the corresponding formation of the South American and Indian continents, and how far they were productive of similitude in the animal or vegetable kingdoms of those regions; and, we must hope, that the comparison will ere long be made with the attention it deserves.

In reference to peculiar degrees of temperature, as influential in characterising climates of various kinds, I may here state, that the subject will be reverted to in another division of this paper: it may be necessary, however, here to observe, though it is a well known fact, that cool air may be produced as well by altitude as latitude, as is sufficiently experienced on various table lands in our Asiatic dominions—*The Mysore Country—The Nilagiri Hills*—and *The Himalaya Mountains*. The cause of reduced heat in the higher regions of the atmosphere, is ascribed by LESLIE to the enlarged capacity for heat which air requires by rarefaction; he has further said, that particular elevations may be nearly ascertained from an observation of the mean temperature. In the torrid zone, where so many suffer from long continued exposure to ardent heat, such temperate heights³ cannot be too much prized, and often prove, when

¹ Page 320.

² See *Journal*, &c. p. 320.

³ India would appear to have been especially favoured in this respect; in addition to these above-named table lands, we may here notice *Boagickund*, lying east of *Bundickund*, which, by Colonel INOXSIDE'S account, is in its whole extent one continued table land. The province of Haiderábád is an elevated land enjoying a moderate temperature, although the capital of the same name is in latitude 17° 15' N. So is the *Balaghát*, or ceded districts, an elevated country, though not so high as Mysore. Also, the *Mahabuleswar* mountains in the presidency of Bombay, which are about 4,000 feet above the sea; and the *Sikkim Mountains* lying south of the Himalayas, and north of the Bengal district of Rungpúr, (the *sanitarium* of which elevated tracts is at *Dargiling*, about 330 miles from Calcutta, and a most healthy

resorted to, most beneficial to invalids : how far, however, such ought to be relied on in certain indispositions, becomes a question of importance and nice professional discrimination ; for it must ever be kept in mind, that those sites, while no doubt much cooler than the plains below, are, at the same time, oftener exposed to clouds of various descriptions and by no means in their nature innocuous.

The *Himalaya* mountains, which are the *Hindú Kush* of the Afghans and the *Nilagiri hills*, have been repeatedly described by gentlemen quite competent to the task --- the last mentioned lately by Captain HARKNESS and Lieutenant JERVIS, and the former by Messrs. FORBES and ROYLE ; and I shall have occasion to advert to their peculiarities in various parts of these observations.

The altitude of most of the Alpine peaks of the *Himalaya* range have now been pretty nearly ascertained ; the highest of three, in the *Jawahir* district, is the *Nundidevi* of Bishop HEBER, and, according to Lieutenant HERBERT's survey, is supposed to be about 25,749 feet above the level of the sea : there is, however, another which is still more elevated, and is not far from the source of the *Kánduk* river in Thibet. This, Mr. COLEROOKE thinks, may safely be pronounced to exceed 26,862 feet above the ocean, and to be, in fact, properly styled the *Mont Blanc* of the *Himalaya* ; it is called *Dhawala-giri*, or the *White Mountain*, and is, no doubt, as far as observation has yet gone, the most lofty that has been discovered on the surface of the globe, being nearly 5000 feet higher than *Chimborazo*, the most gigantic of the Andes.

What may be the actual climate of such stupendous Alps throughout the year at or near the summits no one can tell. Those of India, the *Himalaya* have been so termed in *Sanskrit* as being the *mansion of snow*.¹ The effects of highly attenuated air are known to be most distressing to some individuals independent altogether of cold, and we believe such GAY LUSSAC experienced them to be during his *ærostatic* voyage ; they were also felt by the enterprising GERARD² at an

spot) : lastly, I would mention the table land of *Davaroypatnum*, which is divided from the table land of Mysore by the *Mayar* river, and that on which *Simla* stands, a station lately established for invalids betwixt the *Jumna* and *Sutledge*, and 7500 above the ocean ; it is in latitude 31°,06, and long. 79°,09.

¹ See MOON's *Hindú Pantheon*, page 151.

² GERARD speaks of *Rol*, in *Baschar*, which is at an elevation of 9350 feet, as being the highest *inhabited* land *without* the *Himalaya*, and where the wheat seldom ripens ; the inferior limit of perpetual snow is calculated by some at the elevation of 11,400 feet above the sea ; but by WENN's observations made on the summit of the *Nittí Ghát*, where no snow remained at an elevation of 16,1814, we have a right

elevation of 15,000 feet, where, he says, he found his respiration laborious, and his exhaustion increasing at every step; nay, MOOREHEAD, and, if I mistake not, others have noticed that even the lower animals feel inconvenience from highly rarefied air.¹ But the *Sanitariums* we have mentioned are in situations much less elevated than the vast heights above alluded to: at those retreats, the advantages derived from an agreeable temperature, suffer no drawback from an over-attenuated atmosphere: in like manner the climate of Bangalore,² in Mysore, which I can speak of from experience as being one of the best in the world, is not affected by this evil, the elevation of the garrison being, according to LAMBTON'S measurement, not more than 3000 feet above the Malabar sea; neither is that of the now far-famed (and we believe justly) climate of the *Nilagiri hills*, where, although only twelve degrees from the equator, and surrounded by plains where the thermometer not rarely stands in the shade at 100°, yet, from its elevated situation, enjoying a mildness of climate not inferior to the temperate parts of Europe: neither, I repeat, does the climate of those lofty regions suffer any deterioration from a rarefied air; on the contrary, it would appear to be salubrious and invigorating in a wonderful degree; and being beyond the general zone of clouds and mists, the air is clear, and does not, at any season, become loaded with those exhalations which occasionally render the most western parts of the Mysore country unhealthy.³

Having particularly alluded to the *Nilagiri hills*, the climate of which is altogether an *anomaly* in tropical regions, I shall briefly here further state regarding them, that they (The Blue Mountains) form an elevated tract in southern India, and lie N.N.W. from the city of *Koimbatore*, towards the *Wynáad*. *Wynáad* being situated between the parallels of 11° and 12° of north latitude, and 76° and 77° of east longitude. They extend from east to west about thirty-six miles in length, and from north to south from 15° to twenty miles in breadth.

to conclude that the height of the snow line on the northern side of the Himalaya range, cannot be less than 17,000. See *British India*, vol. iii. p. 237: according to LESLIE'S formula, the line of perpetual freezing is at 14,621 feet of elevation.

¹ Captain HONGSON tells us that even the natives themselves complain of faintness and difficulty of breathing at these extreme elevations, and ascribe them to exhalations from noxious plants.

² The mean temperature throughout the year at Bangalore, is 73°, 24 of Fahrenheit. The garrison lies in latitude 12° 57' N. in longitude 77° 38' E.

³ For a cause, and a very interesting one, for the unhealthiness of the western tracts of Mysore, when compared with those lying farther east, I refer to an extract of a letter from my friend, the late Colonel LAMBTON.—See *Asiatic Journal* for Jan. 1825, p. 28.

According to Mr. W. Scor's¹ very able and scientific paper respecting those high lands, and which I could wish to see published, it would seem that he considers them as a part of the great chain of ghâts which run along the western side of the peninsula, and may, properly speaking, be said to form a *crest* to that chain: they, he continues, thus constitute a single mountain or ridge, but from the surface being divided into, or studded with, numerous peaks or eminences, it is more usual to speak of the *Nilagiri hills* than *Nilagiri mountain*.

It was only a few years ago that these tracts first called for particular attention, owing to casual circumstances, but which I shall not stop to notice at present; they have since been examined with care by some very accurate observers, and their fine climate greatly eulogised.

The *Nilagiri hills* are surrounded by a belt of flat land, which is, however, at some parts of very considerable elevation, and through which various streams take their course. The mountainous tract itself while studded, as already observed, with ridges of different elevations, and which run parallel to each other, is distinguished by having in its centre a loftier chain running to the N.E. and S.W. On this central ridge are several conspicuous eminences; the highest of them is *Dodabetta*, which Mr. Hough² says is the apex of this mass of mountains, and the summit of which has, we are told, been ascertained to be 8700³ feet above the level of the sea; but it having been also ascertained that the temperature of the *Nilagiris* is upon an average 30° lower than that of the coast, and reckoning at the usual rate of one degree for three hundred feet; *quere*, whether the altitude may not be 9000 feet? Mr. Scor, in his report, makes the height of this Alpine region different from either of these, viz. 8,429 feet, and its mean temperature throughout the year 56° 6". *Otakamund*, a sanitary depôt at which Mr. Hough⁴ seems to have resided, is, according to Scor, 7197 feet above the ocean, and its mean temperature 60° 8'. So *Kotagheri* is 6407 feet above the sea, and its mean temperature 63° 4'; and *Dimhutty*, where a collector lived for some

¹ Of the Hon. Company's Madras Medical Service, and well known for his valuable professional research during a long residence in India.

² See Hough's *Letters on the climate, inhabitants, productions, &c. of the Nilagiris*, p. 18.

³ Captain H. HARKNESS, in his well-written and interesting "*Description of a singular Aboriginal Race inhabiting the Summit of the Neilygherry Hills*," makes *Dodabetta* to be 8760 feet above the sea, and about 1300 feet higher than *Otakamund*. (See weather-table at the end of the volume.)

⁴ See his *Letters*, p. 36.

time, is 6166 feet above the same level, and its mean temperature $64^{\circ} 1''$.

The gentleman just mentioned informs us, that from observations he made during twelve months' residence at *Otakamund*, he concluded that the greatest heat was in May, when the thermometer sometimes rose as high as 69° at noon, and that he has known it fall in a frosty morning in December as low as 20° *Fahrenheit*¹ before sunrise; but this last I should suppose was an extreme case;² what we may with safety say, however, is, that on those hills the mean temperature in April and May may be 65° in the first month, and 64° in the second, and that the minimum cold is a little below the freezing point, and the maximum heat 59° in the cold season. Other accounts, as in almost every thing else, vary, though Dr. YOUNG remarks, that the greatest cold has never been known to exceed 28° , or the greatest heat 59° , making a range of 31° . In equability of temperature, Mr. HUGH observes, those elevated tracts are not surpassed by any country in the world; but here, if the account I got some years ago from Dr. CHRISTIE,³ late of Columbo, in Ceylon, be correct, that gentleman labours under a misconception, for Dr. C. states, that at Columbo, the medium range for the twelve months is only betwixt 74° and 85° .⁴ An equable climate, no doubt, contributes greatly to health, and hence it is that *Chittagong*, though in a much warmer clime than the *Nilagiris*, is considered so beneficial a retreat for invalids, and got from Sir WILLIAM JONES the appellation of the *Montpelier of India*, the extremes of temperature there being betwixt 54° and 87° ; it having, besides, the sea to the westward, which saves it from scorching land winds.

The *Nilagiris* are exposed to both the S.W. and N.E. monsoons; yet, from careful observation, it appears that less rain falls there throughout the year than on either coast. The air is, by every account, pure, elastic, and dry, in a remarkable degree, affording at once great comfort to the sick, who fly to it for relief, and peculiar

¹ See same, p. 37. Mr. HUGH's thermometer was hung in the open air in the morning and evening, and at noon in a room, through which the air was allowed to circulate.

² By Mr. HUGH's account, however, in one very cold year, 1825, and in Dec. that year, it was for three days together as low as 19° .—See *Letters*, p. 128.

³ See *Asiatic Journal* for Jan. 1825, p. 33.

⁴ The temperature of *Malacca* (in lat. $2^{\circ} 12''$) is also extremely uniform, not varying more than 14 or 16 degrees during the whole year, the medium temperature is about 80° .—See *Official Papers on the Medical Statistics and Topography of Malacca*, by Dr. WARD and Mr. GRANT, p. 13, published at Penang.

energy and vivacity to those in health who visit the mountain range for curiosity or amusement.

One cause to which the great healthiness of those heights has been ascribed, is their freedom from jungle, the well-known pestiferous source of what has been termed the *jungle* or *hill* fever, in so many hilly and thickly wooded districts in India.

If we are to compare the respective climates of the *Himalaya* and the *Nilagiris*, we shall find, according to HOUGH, "that the temperature of the first, at an equal elevation, is neither so cold nor so equable as that of the latter, probably owing to the peninsular mountains being nearer to the sea."¹ Mr. MONTGOMERY MARTIN, in his *History of the British Colonies*, just published, expresses an opinion, that these alpine heights (*Nilagiris*,) resemble, in climate, that experienced in the higher parts of the greater intertropical cities of *America*,² and that, in their general features, they may be compared to the table-land of Spain on which Madrid³ is situated. The same author also remarks, that the mean temperature of *Otakamund* is rather more than that of London, but that the annual range is very small, and the heat never sufficient to bring the more delicate fruits to perfection.⁴ But for a far more philosophical opinion of the peculiar climate of the same elevated tracts, let us see what Mr. SCOT says (in his paper already mentioned) of a report by a literary friend.

"The meteorology of the *Neilgherry hills* forms the subject of an extremely interesting and able paper, which has been drawn up by Mr. DALMAHOY, from the materials in possession of the medical board of Madras, and from observations made by himself during a short residence amongst the hills. This gentleman states, in reference to those high lands, that it may be concluded, in respect to the smallness of the range of temperature and the greatness of the quantity of rain, that the climate of *Otakamund* is of an *intertropical* nature; but that as regards mean temperature, it is characterised by that of a place in the temperate zone, at the level of the sea, corresponding to 46° 39". In an inquiry into the causes of the diseases of hot latitudes, such a climate as that of *Otakamund*, in which the great intertropical features are disjoined, would offer a fair opportunity of instituting, though an imperfect, still perhaps a valuable, *experimentum crucis*, particularly respecting the pressure of the atmosphere, the temperature, the quantity of rain, and the general state of the weather."

¹ See HOUGH's *Letters on the Climate, Inhabitants, Productions, &c. of the Nilagiris*, p. 130.

² See MONTGOMERY MARTIN's *History of the British Colonies*, vol. i. p. 96.

³ See same, p. 72.

⁴ See same, p. 96.

Before descending from those alpine regions, where some may think I have too long detained them, I could wish to offer a few observations on their vegetable products, the human race by which they are inhabited, and the lower animals which there range. M. LESCHNAULT DE LA TOUR, *Naturaliste du Roi*, in a letter, dated Pondicherry, July 5th, 1819, gives us some interesting particulars respecting those mountains, where he tells us he found many plants agreeing with those of Europe, such as the *Vaccinium* (bilberry), *Rhododendrum-Fragaria* (strawberry), *Rubus* (bramble), *Anemone-Geranium* (crane's bill), *Plantago-Rosa Salix* (willow), &c.: other plants of greater value there cultivated, to use his own words, are, *le blé, l'orge, les lentilles, le pospel-froment, la cretelle, plusieurs espèces de milles, et les pois chiches*. Horticulture is now much attended to at several of the dépôts of the *Nilagiris*; it appears, however, to have been more successfully pursued at *Otakamund* than *Dimhutti*, owing to the greater heat of the last-mentioned station, and also from the circumstance of the first being more within the influence of the south-west monsoon.

No person seems to have been more active than the gentleman I have just named (LESCHNAULT) in botanical research, during the short stay he made in those elevated tracts, where, Mr. HUGH informs us,¹ he collected upwards of 200 plants, the greater part of which were specimens not before known in India: such is the debt of gratitude we owe to that celebrated French naturalist!

The botany of that still higher range of mountains, the *Himalaya*, has, of late years, been considered as an object of no small importance; and we are all, or most of us, sufficiently well acquainted with the labours of a HARDWICKE, a TRAIL, a GERARD, a WEBB, and a MOORECROFT, &c. and must ever be thankful for the great scientific acumen and lucid arrangement which have been shewn by Dr. WALLICH, and subsequently by Mr. ROYLE. The latter, in his "*Illustrations of the Botany of the Himalayan Mountains*," by way of attaining a greater precision respecting the peculiarities of vegetation, as connected with the climate of successive elevations, proposes to divide the slope of the *Himalaya* into *three* several *belts*, and take separate notice of each. "The first," he says, "may be supposed to extend to between four and five thousand feet above the sea, as several tropical perennials reach to the latter, and snow does not usually fall below the former. The second belt may be conceived to

¹ See HUGH's Letters on the Climate, Productions, Inhabitants, &c. of the *Nilagiris*, p. 118.

embrace the space between five and nine thousand feet of elevation, as the winter's snow is always melted from such heights before the accession of the rainy season, and the upper is nearly the limit to which the herbaceous plants of tropical genera extend. The third belt may be taken from this elevation, up to the highest limits from which snow melts away on the southern face of the Himalaya mountains. "The stations of *Simla*, *Mussín*, and *Londúr*," Mr. ROYLE remarks, "having been much resorted to for health, their climate and vegetation attentively observed, and offering an altitude of 7500 feet, will afford a good illustration of the central belt; in which, with a range of the thermometer of 53"—that is, from 27° to 80°—and with a mean temperature of about 55°, observed at this elevation in 30° north latitude, we could not expect the existence of any plants either belonging or allied to tropical genera; and seldom in fact do we meet with them, except in the rainy season, and in a moist, mild, and equable atmosphere."¹ It would also appear, that the *arboreous* vegetation of the second belt corresponds entirely with that of the temperate climes; such as the *rhododendron*,² *arboreum*, and species of *quercus*, *acer*, *ulmus*, and *caprinus*. There are also found other features distinguishing those climes, where man, according to Dr. CANDOLLE, attains the greatest perfection,³—a rich, thick sward, and numerous delicate annuals. With regard to wheat and barley, Captain GERARD, we know, met with the first at 10,000¹ feet of elevation, and Mr. ROYLE with the second at upwards of 8000.

Within the third belt, and on *Choor*, Mr. ROYLE tells us, that in May the only bushes he discovered were the juniper and currant; the thermometer then ranging betwixt 42° and 60°. The summit, or highest peak of this mountain, is 12,149 feet above the ocean. In reference to the same southern slope of the Himalaya, and within the limits of Mr. ROYLE's third belt, Captain GERARD informs us that he found the extreme height of cultivation to be 10,000 feet, the highest habitation 9000 feet, and that 11,000 feet may be reckoned the upper limit of forest, and 12,000 that of bushes. This is no doubt a prodigious height at which to find plants of any kind; yet so various are the operations of nature, connected with climate, that the same intelligent traveller just mentioned, hesitates not to remark,

¹ See *Illustrations of the Botany of the Himalaya Mountains*, Part i. p. 16.

² *Idem*, p. 17.

³ *Idem*, p. 17.

⁴ It would, however, appear that Captain WERN found wheat at 12,000 of elevation.—See *Illustrations*, §c. p. 19.

that if vegetation did not extend still higher, Tartary would not be habitable!¹

When we consider animal life in the elevated lands of tropical countries, we perceive that there the difference is as conspicuous as it is in the vegetable kingdom. The inhabitants of the *Nílagiris* are divided by Mr. HUGH into four distinct classes, *Thodawrs*, *Buddagurs*, and *Kothurs*. It would occupy too much time to give even a brief account of each of these; I shall, therefore, confine my description to the first, who being considered as the *aborigines*, will, I trust, be taken as the fairest test of the effects of *climate*, my chief object in these *Observations*.

The *Thodawrs* of the *Nílagiris*, in Mr. HUGH's opinion, are a very manly and noble race, their visages presenting all the features of the Roman countenance, finely and strongly marked; their tall and athletic figures at the same time correspond with the lineaments of the face, many of the men standing upwards of six feet high. Mr. SCOR in speaking of them says, they are erect, firm, and muscular; their hair short and curled; their complexions brown; their beards bushy, and so pleasing are they in aspect, that in a whole village it would be difficult to find one man who was not handsome. They are, besides, by every account, extremely cheerful, frank, playful, powerfully strong, and in their deportment altogether free from every thing like servility. The women, HUGH observes, have handsome features, and their complexion is fairer than that of the men; their teeth are beautiful; their hair, of which they are proud, redundant; their feet small; and their children healthy and active. If these physical and moral qualities do not speak loudly in favour of the climate of this mountain range, I do not know what could. The inhabitants are, moreover, remarkable for attaining great age—another proof of its salubrity. There is, however, something further still to be mentioned, to which the pure temperament of this people may be in some degree ascribed, and the fact I consider as one of great importance: it is, that by Mr. SCOR's report it appears that neither *arrack* nor *toddy* are to be procured on these hills; in fact, that the natives are totally unacquainted with the manufacture of spirituous liquors. Where, then, could be found a more fit *sanatarium* for soldiers, who had become infirm through habitual inebriety, than some well-chosen station amongst those celebrated heights? And what more convincing argument, I would ask, could be brought forward in opposition to those who rail against *temperance societies*, than the singular fact we have just stated?

¹ See a paper by Mr. H. T. COLEBROOKE on the River Setlej.—*Royal Asiatic Society's Transactions*, vol. i. p. 357.

Under the head of zoology, as connected with the climate of the mountainous tracts of India, it may be remarked, that amongst the *Nilagiris* are found the wild hog, wolf, and jackal; also sheep and hares of various kinds. The wild dog there met with is a fine-looking animal, not unlike an English fox,¹ but about twice the size, and having a large, bushy, black tail; they are very ferocious, hunt in packs of eight or ten, and run down the elk with great ease. Eagles and vultures are not rarely seen, and a great variety of kites, some of which are very large; wood-cocks, wood-pigeons, plovers, snipes, partridges, swallows, larks, thrushes, blackbirds, and sparrows, are common: and Hough tells us, that the notes of the singing-birds are quite as melodious as those of the same species in Europe.

With respect to the *Himalaya* mountains, in reference to this branch of natural history, Mr. ROYLE observes,² that within the second belt the tiger and leopard occasionally prey. There the fox in size and colour approximates to the English variety; and there, too, the flying squirrel supplies the place of the flying fox, or bat, of the plains: he, moreover, remarks, that the porcupine of the hills does not seem to differ from that of the plains, and that the wild dog, like the wild hog, is found at every elevation. In speaking of the feathered tribe, he says, "what particularly indicates the temperate climate of this middle belt is, that while the eagle and vulture are, as elsewhere, in the mountains seen soaring aloft, it is here alone that the cuckoo is very common, in fact heard every where."

In the third belt, this intelligent traveller states, that the animal kingdom affords many of the same indications of the alpine nature of the country, as have been presented by the vegetable kingdom. The *moschus moschiferus*, or *Thibetan musk*, is found on the mountains in the vicinity of the snow. The *gyphaeors barbatus* is also there found as in the Alps; and the raven frequently met with in the plains in winter, is here seen in May.

It would appear from what has been said by Mr. ROYLE, that there is a considerable difference of climate betwixt the *southern* and *northern* face of the *Himalaya* mountains; so that while on the latter Captain WEBB found cultivation extend to 11,500 feet of elevation, Captain GERARD could not find it beyond 1000 feet on the former; a variation, Mr. ROYLE, with much reason, ascribes to this cause, "that the elevation of the Indian snowy range is sufficient to prevent

¹ See Capt. SYKES's Account of the Wild Dog. — *Transactions of the Royal Asiatic Society*, vol. iii. p. 405.

² See ROYLE's Illustrations of the Botany of the Himalaya Mountains, Part i. p. 20.

the passage across of the cloudy masses which deluge the plains of northern India with rain, both in the cold and warm season; the atmosphere, therefore, on the northern face preserves unimpaired the dryness which is characteristic of the rarefied air of lofty situations; hence the little deposition of snow which takes place in winter, in proportion to the lowness of the temperature"—a fact, Mr. R. ingeniously adds, "tending to confirm Mr. DANIELL'S views respecting the superior energy of the solar rays in the higher regions of the air."¹

Every one knows how cool air is obtained by passing into temperate latitudes; and it is as well known how the like advantage can be procured by reaching to a certain elevation in mountainous countries. But there are certain situations in Hindústán, where, owing to peculiar topographical position, the same great blessing may be enjoyed, and in no way depending on either latitude or altitude. Amidst the mountains stretching from north to south, in the Tinnivelly district of southern India, and in latitude 8° 56' N., is the valley of *Kírtalum*, open towards the Coromandel coast; but so deep in its westerly direction, as to leave but a rather narrow strip of the high range betwixt it and the base of the Malabar coast: the consequence of this is, that in the months of June, July, and August, when the south-west monsoon prevails, while the chief burst of it falls in torrents on that narrow strip, there is only a delightful sprinkling of it extended in frequent light showers to this charming spot; a much-prized *retreat for invalids* from the Coromandel side during the period just mentioned, owing to its coolness,² and being in an extraordinary manner exempt from dampness, so that iron remains for a very long period without rusting. Exercise can be taken at any hour of the day out of doors; and what is commonly called catching cold, however often wet by the rain, is altogether unknown. But mark the converse to all this in other months of the year: in February, March, and April, when southerly winds blow, and the valley is unventilated in consequence of the mountains lying south of it, *Kírtalum* becomes extremely unhealthy; the combined result of that particular position, and the great abundance of rank vegetation on all sides, arising from that part of the district partaking of both monsoons.

The means last to be noticed of procuring cool air in hot weather

¹ See ROYLE'S Illustrations of the Botany of the Himalaya Mountains, Part i. pp. 33-39.

² The difference of the thermometer betwixt *Palamcota*, on the Coromandel coast, in lat. 8° 35', and long. 79° 37', and *Kírtalum*, is about 10° in the months of June, July, and August; *i. e.* while at the latter it is 75° at seven A.M., it is at the former 85°.

in India, strictly speaking, does not come within the proposed object of this paper, being altogether unconnected with climate—I mean that by evaporation, in having loosely woven *tatties* or mats prepared with the fragrant-smelling roots of the *andropogon muricatum*, kept wet, so that the land-wind on blowing through them is rendered singularly cool and refreshing. The plant from which the root is obtained is the *vittie* of the *Tamils*; the *Kuru* of the *Telligús*; the *viratara* of the *Bráhmans*; and the *خس خس*, *khas khas* of the Persians. Its common Bengáli appellation is *bena*.

We have seen that in similar latitudes similar climates are not always found; but even when they do correspond to a certain extent, it has been remarked that they are not always productive of exactly similar results. “The genius of political wisdom and civil arts,” as FERGUSON has somewhat strangely expressed it, “appears, unconnected with either, to have chosen his seats in particular tracts of the earth, and selected his favorites in particular races of men.”¹ It cannot be denied, however, as already observed, that the temperate climates, as they are called, in which are placed our *native land*, *France*, *Spain*, *Italy*, and *Greece*, do favour most the nature of man; and that the extremes of either heat or cold are equally unpropitious to his active genius; and by presenting alike great difficulties to be overcome, or strong inducements to indolence and sloth, equally prevent the first indications of ingenuity, or limit their progress. So, according to FERGUSON, “under the same extremes, the range of the human soul, in a moral point of view, appears to be bounded, and men are of inferior importance, either as friends or enemies; they being, in the frigid zone, dull and slow, moderate in their desires, regular and pacific in their manners; while, under the line, they are comparatively feverish in their passions, weaker² in their judgments, and addicted, by temperament, to animal pleasure.” That they are weaker in their judgments, however high the authority which declares it, I cannot admit, though those judgments may not be always turned to objects of mighty import; nor do I believe that the distinguished author in this instance had any particular personal experience to guide him. To all such general views on a subject, perhaps hitherto too little investigated, there must ever be exceptions; and while it is allowed, that in many other of the great operations of nature, there is yet, alas! much not understood; so the perplexities connected with climate, the physical changes amongst men, and on the face of the globe which he inhabits, are by no means the least obscure. Some

¹ FERGUSON'S *Civil Society*, p. 181.

² *Idem*, p. 168.

writers have gone so far as to question, whether as we see, independent altogether of latitude, elevation, nature of the soil, condition of the countries with respect to religion and government, woods, marshes, lakes, and rivers; whether, I repeat, as are often found, independent of all these, the most striking differences in figure, countenance, colour, disposition, and capability of intellectual improvement, we might not venture to conjecture, with the Greeks and Romans of old, that the Almighty, in peopling the earth, had destined that there should be a diversity of human beings, as well as of other animals, and that each country had allotted to it an indigenous stock of inhabitants? This point has of late led to a good deal of discussion, and has been very ably treated by Dr. J. C. PRICHARD¹ in his *Researches into the Physical History of Mankind*. It would lead me wide from my immediate object, were I to enter at large on such matters. This I must now declare, however, notwithstanding the discrepancies to be reconciled, that we ought without hesitation to acquiesce in the opinion, supported by the highest of all authority, that mankind are the offspring of common parents. And we know that the great LINNÆUS (and who has brought a more intelligent mind to bear on the subject?) maintained, that in every species of plants, as well as of animals, only one pair was originally produced: “*Unum individuum ex hermaphroditis et unicum par reliquorum viventium fuisse primitus creatum, sana ratio videtur clarissimè ostendere.*”

The exact cause or causes of the difference of colour in the human race, have not been considered as the least difficult to explain of all those above alluded to. We shall not say what degree of credit is to be given to BURTON in such inquiries; but we find him thus expressing himself: “It is evident that the *colour* depends principally upon the climate, and that, on the other hand, *peculiarity of feature* is consequent more of the customs prevalent amongst different nations.” And there is no question but that nations are found to be gradually darker in complexion the nearer we get to the equator; for instance, an Italian is almost invariably of a deeper hue than a Dane or Swede; but it appears to me that a distinction ought to be made betwixt the brown shade produced by tanning from the sun, and that jet black distinguishing the Ethiopians, who have the *rete mucosum* quite black: and it is a well-established fact amongst anatomists, that this second lamina of the skin, while it is white, brown, or yellowish in the European, is black in the negro.² In opposition to all

¹ See PRICHARD'S *Researches into the Physical History of Mankind*, Introduction, p. 2.

² See HOOPER'S *Lexicon Medicum*, article Skin.

this, it has been advanced by Dr. ROBERTSON, that men of a foreign race acquire the colour and general appearances in the course of a few generations, and become almost in every respect similar to the aborigines of the country into which they are transplanted;¹ and it has been remarked by PRICHARD,² that the descendants of the Portuguese who first settled in Africa, on the *Senegal*, are now become as dark as the negroes; and that the Saracens, Moors, and Arabians, who first occupied the west coast of Africa, from being originally white, tawny, or yellow, are now quite black. ROBERTSON thinks that the Jews every where, and certain religious castes amongst the Muhammedans, are seemingly exceptions to this observation; but to verify an old Roman adage, "*Quot homines tot sententiæ*," let us see what a very opposite opinion has been advanced by PIRRA in his work on climate, who says, in speaking of the Jews, "Descended from one stock, prohibited by their most sacred institutions from intermarrying with other nations, and yet dispersed into every country in the globe, this people is marked with the colour of all—fair in Britain and Germany; olive in Syria; brown in France and in Turkey; swarthy in Portugal; and tawny, or copper-coloured, in Arabia and Egypt."³ This assumption, however, I conceive to be somewhat too forcible; at all events, of one thing I am sure, that the Ethiopian in England never changes his hue, and that both the *Pársís* in the northern and western tracts of India, and the *Musalmán*s of the Peninsula, are, generally speaking, a much fairer race than the *Hindús* in the same tracts; and that in their appearance and manners they are as opposite as day and night: yet we know how remote the periods at which both left the lands of their forefathers—the first to escape from the doctrines of Muhammad, the last to extend their dominion, armed alike with the Korán and the sword.⁴

¹ See ROBERTSON's *Natural History of the Atmosphere*, vol. ii. p. 243.

² *Idem*, vol. ii. p. 243.

³ See PIRRA on the *Influence of Climate*, p. 17.

⁴ Since finishing this part of the *Observations on Atmospheric Influence*, &c., I have seen in the *Asiatic Journal* for June 1834, p. 104, "Some Account of the Colonies of New South Wales and Van Diemen's Land, by Mr. JOHN HENDERSON," in which are expressed opinions regarding the colour of the inhabitants, which appear to me singular, and are certainly at variance with those generally entertained on the same subject. He observes, "It has already been mentioned, that the country-born offspring of Europeans evince a tendency to a fairer colour of skin, eyes, and hair, than that possessed by their respective parents. Now, we can observe no such corresponding tendency to a fairer colour amongst the aborigines, but rather the reverse. These are all of a dark colour, which is rather found to be increased by the cold produced by a higher latitude. The inhabitants of Van Die-

Having now stated all that occurs to me as necessary to be said in the first part of the *Observations on Atmospheric Influence, &c.* I shall conclude; but it is what I cannot do without apologising for having so long occupied the attention of the Society, and offering my best thanks for the kind indulgence.

men's Land, which is in latitude 42° south of the line, are darker than those of Port Jackson, which is about 36° , and considerably more so than those in the interior of New South Wales." By this it would seem, that cold in these regions so far from conducing to make the colour of the natives lighter, has just the opposite effect.

END OF PART I.